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The effect of balneotherapy and physical therapy applied to patients with chronic lack pain on pain intensity, quality of life, disability and mental symptoms

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ABSTRACT

Aims: The aim of present study was to evaluate effects of balneotherapy and physical therapy combination against only physical therapy on pain, guality of life, disability and psychological symptoms in chronic low back pain.

Methods: Sixty patients with chronic low back pain were included in the study. Patients were divided into two groups: Balneotherapy and physical therapy group (n=30) and physical therapy group (n=30). Balneotherapy group hospitalized for 20 minutes a day every day for 3 weeks to balneotherapy sessions with 40°C thermomineral water and 5 days a week for 3 weeks to 15 sessions of physical therapy session. Physical therapy group recieved 5 days a week for 3 weeks to 15 sessions of physical therapy session in the treatment unit Both groups recieved ultrason treatment which has 1.5W/cm 2 dose and 1MHz frequency for 6 minutes, Transcutaneous Electrical Nerve Stimulation (TENS) (50-100 Hz) for 20 minutes and hot pack for 20 minutes as physical therapy. Patients in both groups were given a patient-based standardized lumbar exercise in addition to physical therapy. The following parameters were measured: Visual Analog Scale (VAS) for pain intensity, Short Form-36 (SF-36) to evaluate guality of life, Oswestry Disability lndex (ODI) to evaluate functional disability and Symptom Check List-90 to query psychological symptoms. First evaluations were done at the beginning of treatment and second evaluations were done at the end of treatment before and after treatment.

Results: We observed more significant decrease in VAS scores in the group administered balneotherapy (FT+BT) and physical therapy compared with the group treated only physical therapy (FT) (p<0,05). At the end of treatment in FT+BT group subscale of guality of life; Physical role limitations, mental health, pain and general health were significantly higher than the FT group (p<0,05). In FT+BT group except social functioning and in FT group except vitality and general health, ali other dimensions of guality of life showed significant improvement (p<0,05). Although pretreatment disability rate of FT+BT is more, in this group decline of scores were more (30.4% to 14.2%). When compared to before and after treatment scores on the SCL-90 sub-parameters in FT+BT individuals were significantly different in ali the sub-parameters but in FT group except phobic anxiety and paranoid ideation, found significant differences in other parameters (p<0,05). In addition the decline of statistically significant decrease in the parameters was observed lesser extent in FT group compares to FT+BT group.

Conclusions: In present study we observed that balneotherapy in addition to physical therapy against routin physical treatment program showed more decline in pain and functional disability, more increase in guality of life and more improvements in psychological symptoms in addition relationship between psychologic symptom scores and disability is stronger than the relationship between psychologic symptom scores and pain scores.

Keywords: Chronic low back pain, guality of life, functional disability, psychological symptoms, balneotherapy

INTRODUCTION

Low back pain is defined as pain, muscle tension and stiffness in the region between the lower border of the 12th costa and the lower gluteal sulcus proximal to the thigh, with or without leg pain.[1] Low back pain is classified as acute if it is less than 6 weeks, subacute if it is 6-12 weeks, and chronic if it is more than 12 weeks.[2] In a review published on the approach to chronic low back pain, it is said that low back pain in the United States costs $14 billion per year.[3] The aim of the treatment of chronic low back pain is to control pain, reduce the number, severity and duration of new attacks, disability, distress, anxiety and disease behavior, increase the level of functional activity and educate the patient.[4]

Many treatment methods can be used in the treatment of chronic low back pain. Exercise programs, physical therapy agents, medical treatment, complementary medicine applications, surgical treatment and combined treatments are

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frequently used options.[1] Although treatment methods such as exercise, superficial heat pack, transcutaneous electrical nerve stimulation (TENS) and ultrasound are controversial in the literature, it has been shown that they are used in non-inflammatory chronic pain and can be effective.[5] Among the methods used in the treatment of such a common health problem are healing waters, mud, and massage used in various diseases since ancient times.[6-8] Today, these treatments can be given together within the scope of the concept of spa cure or spa treatments.[9] Chronic low back pain can lead to deterioration in the patients' quality of life, disability, physical and psychological problems.[10]

Chronic pain has now become a syndrome rather than a finding as a common health problem in clinical practice, and the coexistence of psychiatric symptoms is quite high.[11-13] Sometimes it can be a symptom of depressive disorder, and sometimes it can lead to disruptions in the mental world of the person as a physical disorder.[11] Anxiety Disorders, Somatoform Disorders, Psychosis, Personality Disorders, Post-Traumatic Stress Disorder, especially Depressive Disorders "diagnoses frequently appear as co-diagnosis in patients with chronic pain.[14]

Considering all these positive effects of physical therapy modalities and balneotherapy on chronic low back pain, it is thought that subjecting these individuals to these treatments for chronic low back pain will have a positive effect on patients' pain scores, quality of life, disability, and mental symptoms. In this study, we aimed to examine the early effects of physical therapy alone and with the combination of balneotherapy and physical therapy applied to patients with chronic low back pain on pain severity, quality of life, disability and mental symptoms.

METHODS

The study included 60 patients aged 18-85 years with noninflammatory chronic low back pain who were admitted to the clinic of the Department of Physical Medicine and Rehabilitation of Cumhuriyet University Faculty of Medicine between July 2014 and February 2015. The study was initiated with the approval of the Cumhuriyet University Medical Faculty Clinical Researches Ethics Committee (Date: 18.06.2014, Decision Number: 2014-06/02). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Exclusion criteria were the presence of uncontrollable systemic disease, previously known psychiatric disease history, low back pain with red flags, presence of malignancy, osteoporosis accompanied by a vertebral fracture, and surgical lumbar history. Before the treatment, the patients were questioned in terms of age, gender, pain severity, quality of life, functional disability and mental symptoms. The patients were divided into two groups as physical therapy-balneotherapy (PT+BT) group and physical therapy (PT) group. Both groups underwent physical therapy at a dose of 1.5 W/cm², 1MHz frequency and 6 minutes of ultrasound treatment, 20 minutes of Transcutaneous Electrical Nerve Stimulation (TENS) (50-100 Hz) and 20 minutes of heat pack application. In addition to physical therapy, both groups were given a patient-specific waist exercise program. In addition, all patients continued to receive routine medical treatment (nonsteroidal anti-ınflammatory drugs (NSAIDs), myorelaxant, and topical analgesics). In addition to the FT+CT group, balneotherapy treatment with thermo-mineral water at 40°C for 20 minutes every day for 3 weeks was applied for a total of 15 sessions. After the treatment, the patients were questioned again in terms of pain severity, quality of life, functional disability and mental symptoms. Balneotherapy, physical therapy and exercise programs were planned by the doctor. During physical therapy, patients were accompanied by a research assistant doctor and a physical therapy technician. Before and after the balneotherapy session, the vital signs (blood pressure, pulse, fever, respiratory rate, etc.) of the patients were checked and a nurse accompanied the patients during the balneotherapy.

Evaluation Parameters

Sociodemographic information form: The gender and age (year) of the patients were recorded in the sociodemographic information form when they were included in the study.

Visual Analog Scale (VAS): The pain intensity was measured using the VAS. Patients were asked to rate their pain on a 10-cm line anchored by two descriptors: 0: no pain and 10: unbearable pain

Short form-36 (SF-36): The quality of life was assessed using the validated Turkish version of the SF-36. The SF-36 is a multidimensional tool measuring eight domains: physical functioning, physical role limitation, body pain, general health, vitality, social functioning, emotional role limitation and mental health. Domain scores range from 0 to 100 and higher scores indicate a better quality of life.

Oswestry Disability Index (ODI): Oswestry Disability Index (ODI) was used before and after treatment to determine the degree of disability. ODI consists of 10 items that measure pain intensity, personal care, lifting, walking, sitting, standing, social life, sleeping, traveling, and the level of pain. Each item is graded between 0-5, and as the total score increases, the level of disability increases. The maximum score is 50 points. It is evaluated as heavy between 31 and 50, moderate between 11-30, and mild between 1-10.

Symptom Checklist-90 (SCL-90): Mental symptom questionnaire was performed with the SCL-90 questionnaire before and after treatment. SCL-90 consists of 90 items and 10 subtests. It consists of somatization (SOM), obsessive-compulsive (O-C), interpersonal sensitivity (INT), depression (DEP), anxiety (ANX), anger-hostility (HOS), phobic anxiety (PHOB), paranoid ideation (PAR), psychoticism (PSY) and additional items.

Statistical Analysis

When the data obtained from our study were uploaded to the SPSS version 22 program and the parametric assumptions were fulfilled in the evaluation of the data (Kolmogorof-Smirnov), the significance test of the difference between two means in independent groups, the significance test of the peer-to-peer difference; Mann Whitney U test and Wilcoxon test were used when parametric test assumptions could not be fulfilled. Our data were specified as arithmetic mean ± standard deviation in the tables and the level of error was taken as 0.05.

RESULTS

While the ages of the patients in the PT+BT group were 56,46±13,65, the ages of the patients in the PT group were 51,30±15,64. The difference between the groups in terms of age was insignificant (p=0,178). 15 (50%) of the individuals in both groups were male and 15 (50%) were female. When the pre-treatment VAS values of the individuals in both groups were compared, the difference was found to be insignificant (p>0.05). When the post-treatment VAS values were compared, the difference was found to be significant (p<0.05) (**Table 1**).

Table 1. Comparison of pre-treatment and post-treatment VAS measurements between groups

		Average	Standard deviation	p-value
Pre-treatment VAS	PT+BT	8.43	0.97	0.163
	PT	7.63	1.92	
Post-treatment VAS	PT+BT	3.80	1.21	*0.008
	PT	6.70	9.0	

*(p<0.05), PT+BT: Physical Therapy and Balneotherapy group PT: Physical Therapy group

When the pre-treatment and post-treatment VAS measurements of the patients in the PT+BT group were compared, the difference between the measurements was found to be significant. When the VAS measurements before and after treatment were compared in the PT group, the difference between the measurements was found to be significant, but the pain values tended to decrease more in the PT+BT group (Table 2).

Table 2. Comparison of pre-treatment and post-treatment VAS measurements within the groups

Groups		Average	Standard Deviation	p-value
PT+BT	Pre-treatment VAS	8.43	.97	0.001*
	Post-treatment VAS	3.80	1.21	
PT	Pre-treatment VAS	7.63	1.92	0.018*
	Post-treatment VAS	6.70	9.00	

*(p<0.05), PT+BT: Physical Therapy and Balneotherapy group PT: Physical Therapy group

When the measurements of the post-treatment quality of life sub-dimensions of the individuals in both groups were compared, a significant difference was found in terms of physical role limitation, mental health, pain and general health (p<0.05). When post-treatment quality of life was evaluated in terms of physical role limitation, mental health, pain and general health, it was significantly higher in the PT+BT group compared to the PT group (Table 3). When the pre-treatment and post-treatment Oswestry Disability Index (ODI) scores of the individuals in the PT+BT group were compared, a significant difference was found (p=0,001). When the pre-treatment and post-treatment Oswestry Disability Index (ODI) scores of the individuals in the PT group were compared, the difference was also found to be significant (p=0.001). The decrease in scores was found to be higher in the PT+BT group (30.4% vs 14.2%).

Table 3. Intergroup comparison of quality of life measurement sub-dimensions post-treatment

Post-treatment SF-36 parameters	Groups	Average	Standard Deviation	p-value
Physical function %	PT+BT	59.83	21.31	0.631
	PT	57.00	24.09	
Social function %	PT+BT	53.70	20.23	0.770
	PT	52.22	18.71	
Physical role limitation %	PT+BT	80.00	26.58	0.001*
	PT	47.50	44.69	
Emotional role limitation %	PT+BT	86.66	24.13	0,087
	PT	73.33	34.35	
Mental health %	PT+BT	75.46	9.89	0.006*
	PT	65.06	17.41	
Vitality %	PT+BT	57.16	17.79	0.252
	PT	51.16	22.15	
Pain %	PT+BT	65.92	14.27	0.001*
	PT	50.37	16.17	
General health %	PT+BT	65.00	15.64	0.016*
	PT	55.00	15.42	

*p<0.05, PT+BT: Physical Therapy and Balneotherapy group PT: Physical Therapy group

Table 4. Comparison of Oswestry Disability Index scores of PT+BT and PT groups pre-treatment and post-treatment

	Oswestry Disability Index score (%)	Average	Standard Deviation	p-value
PT+BT	Pre-treatment	66.36	14.14	0.001
	Post-treatment	35.66	14.39	
PT	Pre-treatment	54.06	17.21	0.001
	Post-treatment	39.86	15.22	

When the scores of the SCL-90 sub-parameters of the individuals in both groups were compared, a significant difference was found only in the anger-hostility parameter. SCL-90 scores were found to be higher in all parameters in the PT group compared to the PT+BT group (Table 5).

Table 5. Comparison of scores related to post-treatment Symptom Checklist-90 (SCL-90) sub-parameters between groups

SCL-90 sub-parameters	Groups	Average	Standard Deviation	p value
Somatization	PT+BT	0.78	0.47	0.062
	PT	1.14	0.77	
Obsessive-compulsive	PT+BT	0.70	0.48	0.146
	PT	0.98	0.72	
Interpersonal sensitivity	PT+BT	0.56	0.52	0.727
	PT	0.70	0.76	
Depression	PT+BT	0.44	0.39	0.130
	PT	0.73	0.76	
Anxiety	PT+BT	0.48	0.46	0.435
	PT	0.63	0.73	
Anger-hostility	PT+BT	0.31	0.31	0.038*
	PT	0.67	0.75	
Phobic Anxiety	PT+BT	0.29	0.42	0.071
	PT	0.54	0.73	
Paranoid Ideation	PT+BT	0.41	0.45	0.235
	PT	0.68	0.77	
Psychotism	PT+BT	0.24	0.24	0.058
	PT	0.50	0.62	
Additional symptoms	PT+BT	0.60	0.34	0.677
	PT	0.75	0.68	
General symptom index (GSI)	PT+BT	0.48	0.30	0.179
	PT	0.73	0.68	

*p<0.05, PT+BT: Physical Therapy and Balneotherapy group, PT: Physical Therapy group, SCL-90: Symptom Check List-90

DISCUSSION

Pain, quality of life and inadequacy in chronic low back pain are parameters that have causal relationships with each other and have been used in many cross-sectional or randomized controlled studies in the literature. Pain can greatly affect a person's life by impairing their quality of life and leading to inadequacy.[15] Balogh et al.[16] compared the effects of balneotherapy (30 patients) and hydrotherapy with tap water (30 patients) in a study involving 60 patients. Patients were subjected to outpatient balneotherapy and hydrotherapy sessions in water at 36OC for 30 minutes a day, 6 times a week for 2 weeks for a total of 12 sessions. The patients were evaluated in terms of VAS score, spinal mobility and disability before treatment, after the second week and in the third month. At the end of 2 weeks, the balneotherapy group showed improvement in all parameters except functional disability, and this improvement continued until the third month. In the hydrotherapy group, only the improvement in pain scores at the end of the second week was found to be significant.

Kulisch et al.[17] compared the effects of balneotherapy (36 patients) and hydrotherapy with tap water (35 patients)

in a study involving 71 patients. Patients were subjected to outpatient balneotherapy and hydrotherapy sessions in water at a temperature of 34 C for 20 min. daily for a total of 17-21 sessions for 3 weeks. In addition to both groups, electrotherapy was applied 3 times a week before the balneotherapy session. The patients were evaluated in terms of VAS score, Schober Test, disability and quality of life before treatment, after 3 weeks and at 15 weeks. In the balneotherapy group, a significant improvement was observed in all parameters at week 3 and continued until week 15. On the other hand, only the pain score and quality of life parameters (lower than the balneotherapy group) were improved in the hydrotherapy group.

Tefner et al.[18] compared the effects of balneotherapy (30 patients) and hydrotherapy with tap water (30 patients) in a study involving 60 patients. Patients received outpatient balneotherapy and hydrotherapy sessions in water at 31°C for 30 minutes a day, 5 times a week for 3 weeks for a total of 15 sessions. The patients were evaluated in terms of VAS score, spinal mobility, disability and quality of life before treatment, after 3 weeks and at 10 weeks. When the groups were compared, the balneotherapy group was found to be superior in all parameters. These effects continued at 3 and 10 weeks. There was no significant change in the hydrotherapy group.

Kesiktas et al.[19] compared the effects of balneotherapy (30 patients) and physical therapy (30 patients) in a study involving 60 patients. Patients in the balneotherapy group received outpatient balneotherapy in water at 36°C for 30 minutes a day, 5 times a week for 2 weeks for a total of 10 sessions. The control group (physical therapy group) received 10 outpatient sessions of TENS, ultrasound and infrared treatment. Both groups were given back school and patient-specific exercise programs. The patients were evaluated in terms of VAS score (at rest and movement), Schober test, disability and quality of life, paracetamol dose and lumbar muscle test before treatment, after 2 weeks and at 3 months. In the balneotherapy group, waist extensor muscle test, Schober Test, functional disability, some SF-36 subscores (energy/valency, social function, physical role restriction and general health) showed significant improvement compared to the control group and this effect continued until the third month. Balneotherapy was found to be more advantageous in terms of quality of life and flexibility.

Onat et al.[20] compared the effects of balneotherapy and physical therapy combination (37 patients) and physical therapy alone (44 patients) in a study of 81 patients. Patients in the treatment group received inpatient balneotherapy in water at 38°C for 20 min. per day, 5 times a week for 3 weeks for a total of 15 sessions, and TENS (50-100Hz) for 20 min. heat pack for 20 min. and ultrasound therapy (1 W/cm² dose, 1 MHz frequency) for 45 min. per day, 5 times a week for 3 weeks for a total of 15 sessions. The control group received only physical therapy. Both groups were included in the standard exercise program. Patients were evaluated with VAS, ODI and SF-36 before and after treatment. The improvement in pain, functionality and quality of life scores was significantly higher in the balneotherapy group compared to the control group. In a similar study, Doğan et al.[21] compared the effects of balneotherapy and physical therapy combination (35 patients) and physical therapy alone (25 patients) in 60 patients. Patients in the treatment group received inpatient balneotherapy in water at 40°C for 20 minutes a day, 5 times a week for 3 weeks for a total of 15 sessions, and TENS (50-100Hz) for 20 minutes, heat pack for 20 minutes and ultrasound therapy (1.5 W/cmz dose, 1 MHz frequency) for 6 minutes, 5 times a week for 3 weeks for a total of 15 sessions. The control group received only physical therapy. Both groups were included in the standard exercise program. The patients were evaluated for pre-treatment and post-treatment VAS, disability, and spinal mobility. Pain scores, disability and improvement in the Schober test were found to be more significant in the balneotherapy group than in the physical therapy group alone. In our study, when the VAS values of the individuals in both groups were compared before treatment, the difference was found to be insignificant, but significant after treatment. When the VAS measurements before and after treatment were compared within the groups, the difference between the measurements was found to be significant in both groups, but the decrease in pain was more significant in the PT+BT group. The results were similar to those of Onat et al. and Doğan et al. but the VAS decrease in the PT group was lower in our study compared to these studies. As a result, balneotherapy played a role in pain reduction with an additive effect. With the treatments we gave in our study, we obtained different results in each subscale of SF-36. When post-treatment quality of life was evaluated in terms of physical role limitation, mental health, pain and general health, it was found significantly higher in the PT+BT group compared to the PT group (**Table 3**). Significant improvement was found in all sub-dimensions of quality of life except social function in the PT+BT group and vitality and general health in the PT group.

As a result, it can be said that balneotherapy is effective in almost all parameters of quality of life in chronic low back pain and provides more improvement in physical role restriction, mental health, pain and general health compared to physical therapy. The fact that patients in the PT+BT group stayed away from the physical and emotional stress of daily life and had more resting opportunities may have contributed to this situation. The results were similar to those in the studies of Kesiktas et al.[17], Tefner et al.[18] and Kulisch et al.[19] When the pre-treatment and post-treatment ODI scores of the individuals in both groups were compared, the difference was found to be significant. Although the pre-treatment disability rate of the PT+BT group was higher, the decrease in scores was found to be higher in this group (30.4% to 14.2%). The study of Balogh et al.[16] did not show any improvement in the functional disability score of the balneotherapy group at the end of the treatment, contrary to our study. On the other hand, the decrease in ODI scores in our study was similar to the studies conducted by Kulisch, Tefner, Kesiktas, Onat, Doğan et al.[21] In conclusion, our study in accordance with the literature shows that the addition of balneotherapy to the treatment increases the functionality of the patients and increases the quality of life. Chronic low back pain may lead to deterioration in the quality of life and disability of patients, as well as psychological problems. In a study of inpatients with acute and chronic lumbar syndrome,

Quint et al.[22] found that somatization, depression, anxiety, phobia and psychoticism scores were significantly higher in patients with acute and chronic low back pain compared to the asymptomatic control group; while in the comparison of chronic and acute low back pain, phobia scores and the total number of positive symptoms in chronic pain were significantly higher.

In their systematic review, Pincus et al.[23] investigated the psychological factors in the chronicization of low back pain and found that depressive mood and somatization were important in chronicization. In a multi-center study involving 8304 patients from 86 outpatient physical therapy clinics, George et al.[24] evaluated the patients who were divided into four different anatomical regions: upper extremity, lower extremity, neck and waist, the SCL-90 depression sub-scale before physical therapy, the Numeric Rating Scale (NRS) to determine the severity of pain before and after treatment, and the functional status. As a result, the prevalence of severe depression was found to be more common in women, patients with chronic pain, and patients undergoing surgery. On the contrary, low prevalence was detected in patients over 65 years of age and with upper or lower extremity pain. Depressive symptoms contributed to pain severity and functional status in all anatomical localization except for post-treatment values of the neck region. In the study, it was not specified which patients or patient groups were subjected to which physical therapy modalities methodologically, and the effect of balneotherapy was not examined as in our study, and other sub-parameters of SCL-90 were not evaluated.

Nickel et al.[25] evaluated the quality of life and psychic stress at the first hospitalization and at the end of the first year in a prospective cohort study of 30 patients who underwent inpatient lumbar surgery and 79 patients who did not undergo inpatient surgery in the orthopedic clinic. The decrease in SCL-90 somatization scores at the end of the 1st year in the surgical group was much less than in the other group and it was found that susceptibility to somatization impaired the improvement in physical and mental quality of life. This effect was found to be less in the other group. In our study, when the scores of SCL-90 subparameters were compared after treatment, there was a significant difference only in the anger-hostility parameter, and SCL-90 scores were found to be higher in all parameters in the PT group compared to the PT+BT group. This situation can be explained by the fact that the patients in the PT+BT group stayed away from the physical and emotional stress of daily life and showed more improvement in terms of mental health. When the post-treatment SCL-90 sub-parameter scores of the individuals in the PT+BT group were compared, the difference was significant in all sub-parameters, except for phobic anxiety and paranoid ideation in the FT group. In addition, the decrease in statistically significant parameters was less in the PT group than in the PT+BT group.

Study limitations: Our study is include the limited patient population, the fact that the long-term effects of balneotherapy and physical therapy were not addressed, the patients were not evaluated in terms of spinal mobility, and they were not questioned in terms of drug use, obesity, smoking, education level and occupational status.

CONCLUSION

As a result, in our study, the balneotherapy application added to physical therapy was only compared to the routine physical therapy program; it was found that the patients had more reduction in pain, more regression in their functional disability, more improvement in their quality of life and more improvement in their mental symptoms. We found that it was stronger than the relationship between pain and psychic symptoms. Therefore, adding balneotherapy to routine physical therapy programs as a conservative treatment method may provide additional benefits. The values in our study supported the studies in the literature. There is a need for studies that compare the efficacy of balneotherapy and physiotherapy, include more patients, are methodologically more robust, evaluate the long-term effects of treatments, and investigate treatments in terms of cost-effectiveness.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of the Cumhuriyet University Medical Faculty Clinical Researches Ethics Committee (Date: 18.06.2014, Decision Number: 2014-06/02).

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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